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CEOS/17/WgEdu

Item 11.1

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Earth Observation Education and Training

Report of the CEOS *ad hoc* Working Group on Earth Observation Education and Training

SUMMARY AND PURPOSE

An overview of the main activities carried out by the WGEdu in 2003 is provided in this report, and includes two proposals that the WGEdu presents to CEOS Plenary for decision.

ACTION PROPOSED

CEOS Plenary is invited to review and adopt these proposals for:

(i) CEOS to adopt draft data principles for education training and capacity building purposes together with guidelines to apply them, and
(ii) CEOS to change the status of the WGEdu from *ad hoc* to permanent.

The background and justifications for the proposals as well as a summary of the main activities are presented below and in Plenary Documents 11.2-11.4.

Report of the
CEOS *ad hoc* Working Group on Earth Observation Education and Training

The CEOS *ad hoc* Working Group for Education and Training in Earth Observation (WGEdu) worked on several issues in 2003. **An overview of the main activities carried out in 2003 is provided in this report and includes two proposals that the WGEdu presents to CEOS Plenary for decision.** These proposals are (i) for CEOS to adopt draft data principles for education training and capacity building purposes together with guidelines to apply them, and (ii) for CEOS to change the status of the WGEdu from *ad hoc* to permanent. The background and justifications for the proposals as well as a summary of the main activities are presented below.

Background and mission of the WGEdu

The WGEdu is the implementing body of the priority activity "Education and training", included in the Five Year Plan of CEOS (2002-2007). That activity aims to enable increased uptake and acceptance of satellite data by key institutional users and international research programmes. The WGEdu carries out its work bearing in mind other priority activities of the Five Year Plan: (a) the positioning of CEOS, (b) establishing links with the developing countries, and (c) increasing the utilization of Earth observation data. Through contributing to the strengthening of these four priority activities of CEOS, the WGEdu aims to strengthen indigenous capacity for greater utilization of satellite Earth Observation data in economic and social development programmes as well as for the protection of the environment, particularly in the developing countries. Among the programmes and activities that stand to benefit from an increased use of Earth observation data are those identified in the Plan of Implementation of the World Summit on Sustainable Development.

Priority goals

At is Plenary in 2001, CEOS agreed to the strategic goals developed by the WGEdu. Presented here is the progress made in 2003 by the WGEdu by the priority goals outlined in the Five Year Plan.

Priority Goal:

- CEOS will play a key role in establishing a resource library of information regarding Earth observation training and education together with an interactive, user-driven, web-based access mechanism.

  - Through its work, and building on the collective experience of its members, the WGEdu had identified a number of challenges related to successful capacity building in the developing countries. Although the specific circumstances vary, a main challenge is increasing the awareness of decision-makers to the value of using Earth Observation for policy- and decision-making and its cost-effectiveness as an operational tool in the implementation of their work programmes. Other challenges include increasing the numbers of well-prepared and well-equipped educators of Earth observation and its applications, and needs of various kinds of educational resources. The needs include hardware, software, Earth observation and in-situ data, experience in Earth observation applications as well as education and training materials. One further challenge is increasing access to the existing educational resources, whether at cost or not.

At the same time, space-related entities and user institutions in developing countries have developed a small but significant core of well-prepared and dedicated practitioners and educators. This core is an excellent base to further develop human resources locally. Capacity-building efforts in developing countries are carried out primarily in national space-related institutions, universities and other educational institutions such as the regional centres associated with the United Nations system (e.g. UNESCO, WMO, FAO and the United Nations) as well as in a number of institutions in industrialized countries. By and large, the institutions involved in these efforts are successfully forming a new generation of Earth observation users in the developing countries but still face the challenges noted above.

The WGEdu set out to facilitate activities that enhance national and international education, training and capacity building in Earth Observation techniques, data analysis, interpretation and applications. The WGEdu initially looked at creating an Internet web-based database of already existing educational resources that would facilitate access to those resources, along with information on-f associated costs, where applicable. This web portal site has been named "Discovery Portal".

Discovery Portal

The WGEdu continued to develop a web portal site (Discovery Web Site) that will allow systematic access to information and web links on a broad range of educational resources available from CEOS and others. The web portal will serve as a "one-stop", user-friendly source of information for educators and practitioners. A review of the information content and structure of the web portal will be provided during the Special Event scheduled immediately prior to the 17th CEOS plenary meeting. The materials in the web portal will include computer and web-based education and training programmes (e.g. virtual school rooms and laboratories) for various education levels, remote sensing curricula, data (Earth observation and *in situ*) available through the Internet, image processing and GIS software, case histories, electronically available text books, reference materials, and education and training opportunities. Some CEOS Members have already responded to an invitation by the WGEdu to provide information on the educational resources that they have. A second invitation to populate the web portal will be sent to CEOS Members in the near future. The Discovery Portal will be publicly accessible in the beginning of 2004.

Priority goal:

- While recognizing that CEOS Agencies have their own data policies and data distribution principles, CEOS will draft and adopt a set of general data principles for education and training use. The new set of data principles will enable timely and affordable access to data for Earth observation education and training efforts and encourage CEOS Agencies to incorporate the general CEOS principles into their own policies as far as possible and practical.

  - One of the findings of the WGEdu is that there is a need for comprehensive Earth observation data and data sets for educational and capacity building purposes. Data that is available through the Internet is not always well suited or complete for education and training in terms of the range of sensor(s) or temporal, spatial and spectral characteristics that could or should be used in specific applications. To address this issue, the WGEdu worked for over a year on a draft set of data principles to support the provision of Earth observation satellite data for education, training and capacity building purposes (not research or operational uses). The text of these draft data principles was developed on the basis of informal consultations with CEOS Members and Associates. On 11 August 2003, the CEOS and the WGEdu Chairs issued a joint invitation to Members and Associates to participate in a Meeting to finalize the text of the draft data principles

with a view to presenting the final version to the 17th CEOS Plenary for its consideration and adoption. CEOS Principals were invited to send representatives to the Meeting or, if not possible, to provide comments, questions or concerns to the WGEdu prior to the Meeting. The Meeting was held at the United Nations Office at Vienna on 12 September 2003.

The draft data principles that the WGEdu is proposing to CEOS Plenary for adoption are the following:

- *CEOS agencies commit to the following set of principles on data provision in support of Earth observation education, training and capacity building and will implement them to the fullest extent possible, within available resources and consistent with agency data policies:*

1) *CEOS agencies should endeavour to provide on a sustainable basis comprehensive and complete data sets for education, training and capacity building purposes.*

2) *When making data available for education and training purposes CEOS agencies should strive to adhere to the satellite data exchange principles in support of global change research (1992)*[1] *and principles on satellite data provision in support of operational environmental use for the public benefit (1994)*[2] *as previously adopted by CEOS.*

3) *CEOS agencies should provide access to data at the lowest possible cost and on a non-discriminatory basis.*

4) *CEOS agencies should provide easy and timely access to their data and information which are to be used for Earth observation education and training. This access can be through individual agencies' distribution mechanisms or through mechanisms developed by CEOS, such as WSSD follow-up Programme.*

A consideration that is central in the above draft principles is that data to be provided by any CEOS Member would be on a voluntary basis and fully in accordance with its data policy. The WGEdu also recognized that Earth observation data to be provided under the principles would be in limited or reasonable amounts to support well-defined education and capacity building activities that are carried out by bona fide institutions. Through a selective application process, the WGEdu would contribute to ensure that only serious and well-defined requests for data reach the satellite operators. **While additional time is required to develop a mechanism for this purpose, to make it possible that data could begin to reach developing countries in 2004, the WGEdu is recommending that the draft principles be adopted together with a set of *ad hoc* guidelines for data provision. Possible *ad hoc* guidelines are presented in the supplemental document titled "Draft *Ad hoc* Guidelines for providing Earth Observation data for Education and Capacity Building".**

If adopted, the data principles would represent a statement of the importance placed by CEOS on the need for sustained education, training and capacity building in the use of Earth Observation data, particularly in developing countries.

[1] http://www.ceos.org/pages/satellite_1.html
[2] http://www.ceos.org/pages/satellite_2.html

Priority goal:

- CEOS Associates, such as the World Meteorological Organization (WMO) and others, have training programmes. CEOS Agencies are strongly encouraged to contribute to educational efforts of the Associates, particularly with regard to the space component.

  - The WGEdu participated in and contributed, to Earth observation education-related events organized in September of 2003 by the (i) United Nations and the International Astronautical Federation, (ii) UNISPACE III Action Team 17, in Bremen, Germany; and (iii) a workshop on capacity building in Africa organized in October 2003 by Module 1 of the CEOS WSSD Follow up Programme at Stellenbosch, South Africa, and (iv) a capacity building coordination meeting at FAO Headquarters in Rome (September 2003). The first two activities produced deliverables in the form of reports containing recommendations and follow up actions to be presented to the United Nations Committee on the Peaceful Uses of Outer Space. The third activity produced draft principles for capacity building and established and African Advisor Group (being presented to Plenary by WSSD Module 1). The fourth activity served to exchange information and coordinate efforts among several institutions that are involved in capacity building.

  - These meetings have served to exchange valuable information and closely coordinate activities among the major international capacity building initiatives that are underway, particularly those of the WGEdu and WSSD Module 1. This coordination and the linkages that have been established will be an asset in considering the various contributions by country or international institution representatives to the work programme of the GEO Subgroup on Capacity Building.

Priority goal:

- CEOS will encourage its Agencies to support the United Nations Regional Centres for Space Science and Technology Education.

  - In 2002, the WGEdu contributed to the updating of the curriculum for remote sensing and GIS developed by the United Nations Office for Outer Space Affairs (UN-OOSA) and to its peer review in 2003. The curriculum was finalized and issued in English, French and Spanish in 2003. Two hundred copies of the curriculum have been delivered to the regional centres in Africa (2) and Latin America and the Caribbean. The curriculum is available in the Discovery Web Site for access by any educational institution.

- To facilitate the continuation of international coordination in this area [education and training], CEOS should consider using the mechanism of workshops where space agencies, institutions offering education and training programmes and other experts can exchange experiences and address issues.

- The WGEdu participated in and contributed to a workshop organized by Module 2 of the CEOS WSSD Follow up Programme on the use of Earth observation data for water resources management with focus on ESA's Tiger Project, held in Rabat in October 2003.

  The WGEdu participated in and contributed to the UN/Austria/ESA Symposium on the Use of Space Technology in support of the WSSD Plan of Implementation, organized by UN-OOSA in Graz, Austria in September 2003.

  Both of these activities identified the capacity building needs of developing countries, with initial focus on Africa, to utilize Earth observation data for water resource management. The results obtained will be presented to Plenary by Module 2 and will be built upon by WGEdu and Module 2 in 2004.

Priority Goal:

- CEOS Agencies will seek to increase awareness of Earth observation technology and applications worldwide with emphasis on developing countries. The focus will be on case studies and affordable technologies.

- In April of 2003, the WGEdu held a Meeting to review the status of its work items and to agree on needed actions to carry out the work given to it by CEOS Plenary. The Meeting was hosted by DLR at its center in Oberpfaffenhofen, Germany. The WGEdu Meeting was followed immediately by a Meeting of Module 1 of the CEOS WSSD Follow up Programme. These joint meetings served to exchange information and to coordinate efforts to be undertaken during the rest of the year. At the WGEdu Meeting, a proposal was made by UNESCO-IOC, and accepted, to join the capacity building efforts of the WGEdu with those of the IGOS-P. This was a welcome development and will avoid duplication of efforts in Earth observation capacity building. It also brings to the WGEdu the complementary perspective and information of the *in situ* observation programmes. The Meeting also served to agree on the need to adopt capacity building principles from the perspective of the developing countries. This focus was followed up at the Workshop organized by Module 1 in Stellenbosch, South Africa. Representatives of the Chair of Action Team 17 (Japan) also participated in the Meeting. Action Team 17 is the team, established by the United Nations Committee on the Peaceful Uses of Outer Space to implement the recommendation on education and capacity building made by the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III). It was agreed that AT 17 and the WGEdu would keep each other informed on their respective activities and would participate in each others meetings to the extent possible.

  By participating in activities organized by UNESCO, WMO, FAO, United Nations and other international organizations, members of the WGEdu continued to contribute throughout 2003 towards the increased awareness of developing countries of the benefits of utilizing Earth observation data for development. However, there is still much more that needs to be done.

Work proposed for 2004

For 2004, the WGEdu proposes the following work activities:

To make the Web Portal available for public access
To invite CEOS Members and Associates to populate the Web Portal
To enable the application of the data principles*
To work on a definite mechanism to apply the data principles*
To support the WSSD Modules 1 and 2, and other Modules as may be needed
To support the GEO Capacity Building Subgroup
To establish network arrangements for exchange on information and coordination with other capacity building and awareness raising initiatives.

*On the assumption that the data principles are adopted by CEOS

Issue: Change from *ad hoc* to permanent status of the WGEdu

The CEOS *ad hoc* Working Group for Education and Training in Earth Observation has been tasked to work until Plenary 2004. At that time, its mandate would either be extended or the WGEdu would be dissolved. **The WGEdu recommends that in view of the commitment CEOS is making this year, and for the foreseeable future, to education, training and capacity building, the status of the WGEdu should be changed from *ad hoc* to permanent**. Such a decision by CEOS Plenary would lend support

and credibility to this commitment and would allow the WGEdu to develop a long-term vision in planning its work.

There are a number of concrete and practical reasons for the WGEdu to become a permanent working group of CEOS.

1. The Discovery Web Site will be a valuable source of information on education and training resources for educators and practitioners. To retain its value, the Discovery Portal will require frequent maintenance and updating, which in turn requires a certain level of coordination among CEOS members and with others in the international capacity building community.

2. Given that education and capacity building is a crosscutting need among all Modules of the CEOS WSSD Follow up Programme, a permanent WGEdu could be a source of a specialized and coherent support. This would avoid duplicating efforts within each Module. The WGEdu has been working very closely with the CEOS WSSD Module 1 on Capacity Building on various education, training and capacity building activities involving Earth observations. Together, they have developed a very synergetic approach to supporting the work of the CEOS Modules.

3. In recent years, there has been a wide recognition of the urgent need for capacity building in space science and technology and in particular in Earth Observation, both in developed and developing countries. As a result, the activities of previously existing education programmes have intensified and new initiatives have been started, some on the global level. A permanent WGEdu would become the CEOS interlocutor (i.e. working level counterpart) and provide linkages to several important capacity building efforts such as the GEO Subgroup on Capacity Building, the IGOS-P, Action Team 17, and to education and capacity building programmes of UNESCO, WMO, FAO, UNOOSA and others.

If the draft principles on satellite data provision are adopted by CEOS, a permanent WGEdu would also allow for a sustainable coordination and identification of data needs of education institutions, availability of data from CEOS Members and Associates, distribution of data and of the feedback reporting on the utilization of the data and its impact on local education programmes.